

Amendments to the Claims:

Claims 1-19 (Cancelled)

[20] **(New)** A plasma etching method of performing plasma etching to an object made of silicon in a treatment chamber, said plasma etching method comprising:

introducing, into the treatment chamber, etching gas which includes fluorine compound gas and rare gas; energizing the etching gas into plasma state by supplying electricity to the etching gas, the electricity having a frequency that is equal to or more than 27 MHz; and etching the object using the plasma.

[21] **(New)** The plasma etching method according to Claim 20,
wherein the etching gas further includes one of oxygen (O₂) gas, carbon monoxide (CO) gas, and carbon dioxide (CO₂) gas, and
the fluorine compound gas is sulfur hexafluoride (SF₆) gas.

[22] **(New)** The plasma etching method according to Claim 21,
wherein the rare gas is helium (He) gas.

[23] **(New)** The plasma etching method according to Claim 22,
wherein a volume of the helium (He) gas introduced into the treatment chamber is equal to or more than 30% of a total flow rate of the etching gas.

[24] **(New)** The plasma etching method according to Claim 23,
wherein an inside wall of the treatment chamber is made of an insulating material.

[25] **(New)** The plasma etching method according to Claim 24,

wherein the insulating material is one of quartz, alumina, an aluminum matrix with alumite treatment, yttrium oxide, silicon carbide, and aluminum nitride.

[26] (New) The plasma etching method according to Claim 21,
wherein the etching gas further includes chlorine (Cl_2) gas.

[27] (New) The plasma etching method according to Claim 26,
wherein a volume of the chlorine (Cl_2) gas introduced into the treatment chamber is equal to or less than 10% of a total flow rate of the etching gas.

[28] (New) The plasma etching method according to Claim 20,
wherein the fluorine compound gas is one of sulfur hexafluoride (SF_6) gas and nitrogen trifluoride (NF_3) gas.

[29] (New) The plasma etching method according to Claim 28,
wherein the rare gas is helium (He) gas, and
a volume of the helium (He) gas introduced into the treatment chamber is equal to or more than 80% of a total flow rate of the etching gas.

[30] (New) The plasma etching method according to Claim 20,
wherein the etching gas further includes polymer forming gas, and
the fluorine compound is sulfur hexafluoride (SF_6) gas.

[31] (New) The plasma etching method according to Claim 30,
wherein the polymer forming gas is one of octafluorocyclobutane (C_4F_8) gas,
trifluoromethane (CHF_3) gas, octafluorocyclopentene (C_5F_8) gas, and hexafluorobutadiene (C_4F_6)
gas.

[32] (New) The plasma etching method according to Claim 20, comprising etching the object by using etching gas which includes one of oxygen (O_2) gas, carbon monoxide (CO) gas, and carbon dioxide (CO_2) gas, and uses sulfur hexafluoride (SF_6) gas as the fluorine compound gas; and then further etching the object by using etching gas which includes polymer forming gas and uses sulfur hexafluoride (SF_6) gas as the fluorine compound gas.

[33] (New) The plasma etching method according to Claim 20, wherein the etching gas is energized into plasma state by an inductively coupled plasma (ICP) method.

[34] (New) A device which etches a silicon substrate, said device forming a trench in the silicon substrate using the plasma etching method according to Claim 20.

[35] (New) A plasma etching method of performing plasma etching to an object made of silicon in a treatment chamber, said plasma etching method comprising:
introducing, into the treatment chamber, etching gas which includes fluorine compound gas and rare gas; and etching the object by energizing the etching gas into plasma state, wherein the fluorine compound gas is tetrafluoroethane (CF_4) gas, and accuracy of an etching depth is increased by lowering an etching rate more, as compared to when gas except tetrafluoroethane (CF_4) gas is used as the fluorine compound gas.

[36] (New) The plasma etching method according to Claim 35, wherein the rare gas is Ar gas.

[37] (New) The plasma etching method according to Claim 36, wherein a volume of the Ar gas introduced into the treatment chamber is 50% to 90% of a total flow rate of the etching gas.